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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,191	05/08/2001	Samuel D. Pritchett	TI-31005	2844
7590	09/21/2004		EXAMINER PATHAK, SUDHANSHU C	
Ronald O. Neerings Texas Instruments Incorporated P.O. Box 655474, M/S 3999 Dallas, TX 75265			ART UNIT 2634	PAPER NUMBER

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,191

Applicant(s)

PRITCHETT ET AL.

Examiner

Sudhanshu C. Pathak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 8th, 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on May 8th, 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

1. Claims 1-to-21 are pending in the application.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;

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- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-8 & 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding to Claims 1-8, the claim 1 discloses an "RF receiver apparatus comprising....." (claim 1, line 1) a mixing circuitry, and analog IF-to-digital baseband converter, and a baseband processing apparatus. However, the claim refers to the "baseband processing apparatus that is a physically separate entity from said RF receiver apparatus" (claim 1, lines 6-7). The claim discloses the baseband processing apparatus being a separate entity from the RF receiver apparatus and also the RF receiver comprising the baseband processing apparatus. A clarification of the claim language is required so as to clarify the subject matter which applicant regards as the invention.

Regarding to Claim 8, the claim recites the limitation "said serial formatted digital baseband signal" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Regarding to Claim 21, the claim recites the limitation "said receiving step" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-4, 6, 9, 13-14, 16, 18 & 20 are rejected under 35 U.S.C.

103(a) as being unpatentable over Mathe (6,243,430) in view of Troster et al. (An Interpolative Bandpass Converter on a 1.2-um BiCMOS Analog/Digital Array; IEEE Journal of Solid-State Circuits; Vol. 28, No. 4; April 1993; Pages 471-477).

Regarding to Claims 1, 9, 13-14, 16, 18 & 20, Mathe discloses an RF receiver apparatus (Fig. 2 & Abstract, lines 1-2 & Column 1, lines 35-51 & Column 5, lines 45-60) comprising mixing circuitry for mixing an analog RF signal down to an analog IF signal (Fig. 2, element 220 & Column 5, lines 60-67 & Column 6, lines 1-6); an analog IF-to-digital baseband converter coupled to said mixer for converting said analog IF signal into digital baseband signal (Fig. 2, elements 224, 226, 240, 250 & Fig. 5, elements 512, 514, 518a-b, 520a-b); an output of the analog IF-to-digital baseband converter coupled to the baseband processing apparatus that is separate from the RF receiver apparatus (Fig. 5, element 530). Mathe also discloses the receiver front end to be separate from the digital processing of the received chain elements (Fig. 2, elements 202, 204). Mathe also discloses the base band processor to be a

digital signal processor, which is implemented as an integrated circuit (Fig. 2, element 250 & Column 1, lines 40-51 & Column 6, lines 10-17 & Column 8, lines 50-64). However, Mathe does not disclose the analog IF-to-digital baseband converter to be implemented with the analog circuitry, physically separate from the baseband processor, instead of being implemented in the digital signal processor.

Troster discloses a bandpass analog-to-digital (ADC) converter, implemented on a 1.2um BiCMOS Analog/Digital array, for a narrow-band transmission systems like the cellular radio mobile receiver (Abstract, Page 471, lines 1-8). Troster discloses implementing the ADC at analog IF frequency to digital baseband (Page 472, Fig. 1 & Page 471, Section II, Converter Architecture, Right-hand column –to-Page 473, Section II, Converter Architecture, Left-hand column). Troster also discloses implementing the converter architecture using BiCMOS technology used for the fabrication of the mixed array, which has been optimized for high performance analog/digital (mixed signal) applications (Page 473, Section III, BiCMOS Implementation, Right-hand column). Troster also discloses implementing the mixed signal circuit as an integrated circuit (Page 475, Fig. 6 & Page 475, Section III, BiCMOS Implementation, Left-hand column). Troster further discloses implementing the converter circuits in the bandpass frequency so as to integrate the complete signal path from IF to digital baseband processing (Page 476, Section V, Conclusion). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention that Troster teaches a mixed signal circuit so as to implement a bandpass analog IF-to-digital baseband converter (ADC) for a cellular radio mobile receiver, and this can be implemented in the receiver as described in Mathe, replacing the analog IF-to-digital baseband converter, so as to provide a further level integration, in the RF receiver, necessary for small-volume hand-held mobile telephones.

Regarding to Claim 3, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. Mathe further discloses the analog IF-to-digital baseband converter includes an A/D converter for digitizing said analog IF signal to produce a digital IF signal, and a digital IF-to-baseband converter coupled to said A/D converter for converting said digital IF signal into a further digital baseband signal (Fig. 2, elements 224, 226, 240, 250 & Fig. 5, elements 512, 514, 518a-b, 520a-b). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Mathe in view of Troster satisfies the limitations of the claim.

Regarding to Claim 4, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter, wherein the said converter includes an A/D converter, and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. Mathe further discloses the analog IF-to-digital baseband converter includes a filter coupled to said digital IF-to-

baseband converter for filtering said further digital baseband signal to produce said first-mentioned digital baseband signal (Fig. 5, elements 520a, b & Fig. 7a, b). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Mathe in view of Troster satisfies the limitations of the claim.

Regarding to Claim 6, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter, wherein the said converter includes an A/D converter and a filter, and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. Mathe further discloses the low pass filter to include a quantizer (Abstract, lines 18-19 & Fig. 3, elements 316a, b & Column 3, lines 28-53). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Mathe in view of Troster satisfies the limitations of the claim.

7. Claims 2, 12, 15 & 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathe (6,243,430) in view of Troster et al. (An Interpolative Bandpass Converter on a 1.2-um BiCMOS Analog/Digital Array; IEEE Journal of Solid-State Circuits; Vol. 28, No. 4; April 1993; Pages 471-477) in further view of Elder et al. (6,167,246).

Regarding to Claims 2, 12, 15 & 17, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. However,

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Mathe in view of Troster does not disclose the RF receiver apparatus to be provided as in integrated circuit.

Elder discloses a single chip fully integrated super heterodyne receiver wherein all the circuit elements are constructed using CMOS technology (Abstract, lines 1-17 & Column 1, lines 10-36 & Column 2, lines 13-67 & Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Elder teaches implementing an RF receiver on a single integrated circuit thus satisfying the limitations of the claim.

8. Claims 5 & 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathe (6,243,430) in view of Troster et al. (An Interpolative Bandpass Converter on a 1.2-um BiCMOS Analog/Digital Array; IEEE Journal of Solid-State Circuits; Vol. 28, No. 4; April 1993; Pages 471-477) in further view of Applicant Admitted Prior Art (AAPA).

Regarding to Claim 5, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter, wherein the analog IF-to-digital baseband signal converter includes a filter, and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. However, Mathe in view of Troster does not disclose the filter to include a decimator.

The Applicant Admitted Prior Art (AAPA) discloses a matched filter (Fig. 1, element 15 & Specification, Page 2, lines 5-13). The AAPA further discloses the matched filter to include a decimator (Specification, Page 2, lines 14-21 & Fig. 2, element 15 & Specification, Page 3, lines 1-18). Therefore, it would

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have been obvious to one of ordinary skill in the art at the time of the invention that AAPA teaches a matched filter to include a decimator thus satisfying the limitation of the claim.

Regarding to Claim 7, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter, wherein the said converter includes an A/D converter, and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. However, Mathe in view of Troster does not disclose the digital IF-to-digital baseband converter to include a CORDIC circuit.

The Applicant Admitted Prior Art (AAPA) discloses an example of the digital IF-to-digital baseband converter to include a CORDIC circuit (Fig. 2, element 14 & Specification, Page 2, lines 8-13 & Specification, Page 3, lines 1-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that AAPA teaches implementing a digital IF-to-digital baseband converter to include a CORDIC circuit thus satisfying the limitation of the claim.

9. Claim 8, 10-11, 19 & 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathe (6,243,430) in view of Troster et al. (An Interpolative Bandpass Converter on a 1.2-um BiCMOS Analog/Digital Array; IEEE Journal of Solid-State Circuits; Vol. 28, No. 4; April 1993; Pages 471-477) in further view of Fukuda et al. (4,665,532).

Regarding to Claim 8, 10-11, 19 & 21, Mathe in view of Troster discloses a RF receiver apparatus comprising a mixing circuitry, an analog IF-to-digital baseband signal converter and a baseband processing apparatus physically separate from the RF receiver apparatus as described above. Mathe further discloses that the analog IF-to-digital baseband converter produces said digital baseband signal in parallel format (Fig. 5, elements "I", "Q" & Fig. 7a-b). However, Mathe in view of Troster does not disclose the analog IF-to-digital baseband converter to include a parallel-to-serial converter connected between said analog IF-to-digital baseband converter and said output for converting said digital baseband signal from parallel format to serial format and providing said serial formatted digital baseband signal to said output.


Fukuda discloses a parallel-to-serial converter for converting data in a parallel format (I & Q) into a serial format after demodulation of the received signal so as to recover the transmitted data in the desired (serial) format (Fig. 2, element 210 & Column 3, lines 29-42 & Column 4, lines 20-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Fukuda teaches a parallel-to-serial converter, and this can be implemented in the receiver as described in Mathe in view of Troster so as to provide a serial data stream received as transmitted by the transmitter, thus satisfying the limitation of the claim. Furthermore, the conversion of the received serial data, in the baseband apparatus, and converting the data to parallel format is a matter of design choice depending on the application and format of the data transmitted from the transmitter.

Conclusion

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak


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